MAUL FOSTER ALONGI
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February 14, 2014
Project No. 8128.01.08

Mr. Dana Bayuk
Oregon Department of Environmental Quality
2020 SW 4th Avenue
Portland, Oregon 97201-4987

Re: Monitoring Well WS-14 Abandonment Plan
Siltronic Corporation
7200 NW Front Avenue, Portland, OR
ECSI No. 183

Dear Dana:

On behalf of Siltronic Corporation (Siltronic), Maul Foster & Alongi, Inc. (MFA) has prepared this letter in response to direction from the Oregon Department of Environmental Quality (DEQ) to abandon monitoring well WS-14 on the Siltronic property. Direction to perform this work was provided in DEQ's January 28, 2014 e-mail correspondence to Siltronic documenting a January 27, 2013 telephone conversation.

BACKGROUND

The nested monitoring well pair (WS-14-125 and WS-14-161) is located near the northwest corner of the Siltronic Property as shown in the attached figure. The wells were completed on July 9, 2004 and constructed in accordance with then-approved DEQ and Oregon Water Resources Department (OWRD) design specifications of 2-inch diameter, flush threaded, Schedule 40 polyvinyl chloride (PVC) riser pipe; and 2-inch diameter, stainless steel wire wrapped 0.010-inch slot screen; and 2-inch diameter stainless steel sump. Monitoring well WS-16-125 was completed to 125 feet bgs and monitoring well WS-14-161 was completed to 161 feet bgs. The monitoring well completion log is included in Attachment A. The well is identified as OWRD well log ID 73526 (see Attachment B).

DEQ has required the abandonment under the TCE Order (DEQ No. VC-NWR-03-16) citing the following reasons:

- The screen and sand pack interval of the monitoring well penetrates the "deep aquitard" identified beneath the Siltronic property.
- The appearance of dense non-aqueous phase liquid (DNAPL) in the monitoring well suggests the installation could act as a pathway for contamination to migrate vertically downward through the deep aquitard into deeper intervals of the Alluvium water-bearing zone.

MONITORING WELL DECOMMISSIONING

Public and private utility-locating services and other information sources will be used to check for underground utilities before work begins. MFA will coordinate fieldwork to locate possible on-site utilities and piping or other subsurface obstructions. For reference, site features near WS-14, including known utility lines and monitoring wells, are also shown on the figure.

Prior to decommissioning, and per DEQ direction, an assessment of the cause for the presence of DNAPL will be attempted by a video inspection of the inside of the monitoring well casing and screen.

The monitoring well abandonment will be conducted in accordance with applicable regulations including Oregon Administrative Record (OAR) 690-240 and previously approved protocols for abandoning monitoring wells at the Northwest Natural and Siltronic sites including an OWRD variance to use bentonite or organoclay/bentonite slurry if DNAPL is encountered.

The abandonment procedures will include, but not be limited to, the following:

- Measuring the depth to water, potential product thickness, and depth to bottom of the monitoring well;
- Over-drilling (via hollow stem auger) the 2-inch-diameter PVC/steel monitoring well to remove construction materials;
- Presence and depth of DNAPL will be documented during the abandonment activities, if possible;
- Confirmation that monitoring well materials have been removed; and
- Sealing the borehole, using bentonite or organoclay/bentonite slurry (in the event that DNAPL is encountered).

Monitoring well construction materials will be characterized and disposed of off-site.

REPORTING

After the monitoring well abandonment activities have been completed, MFA will submit a monitoring well abandonment report to DEQ that summarizes the completion of the monitoring well abandonment.

SCHEDULE

MFA is prepared to begin work immediately upon DEQ review and approval of the proposed approach, subject to availability subcontractors.

Sincerely,

Maul Foster & Alongi, Inc.

Kerry-Cathlin Gallagher
Project Scientist

James G.D. Peale, RG
Principal Hydrogeologist

Attachment: Figure
Attachment A—Monitoring Well Completion Log
Attachment B—OWRD Well Log

cc: Myron Burr, Siltronic Corporation
Alan Gladstone, Davis Rothwell Earle & Xochihua, P.C.
Brian Church, Davis Rothwell Earle & Xochihua, P.C.
William Earle, Davis Rothwell Earle & Xochihua, P.C.
Chris Reive, Jordan Ramis
Keith Johnson, DEQ
Tom Gainer, DEQ
Henning Larsen, DEQ
Matt McClincy, DEQ
Kristine Koch, EPA
Sean Sheldrake, EPA Seattle
Rene Fuentes, EPA Seattle
Chip Humphrey, EPA Portland
Lance Peterson, CDM
Bob Wyatt, NW Natural
Patty Dost, Pearl Legal Group LLC
John Edwards, Anchor QEA LLC
Carl Stivers, Anchor QEA LLC
Rob Ede, Hahn and Associates, Inc.

FIGURE

Source: Aerial photograph obtained from Esri ArcGIS Online.

Legend

- Gasco Station
- MFA Siltronic Monitoring Well
- TarGOST Boring (Approximate)
- Utility Line (Siltronic)
- Siltronic Tax Lot (2013)

Figure
Monitoring Well WS-14 Location

Siltronic Corporation
Portland, Oregon

0 20 40
Feet

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ATTACHMENT A

MONITORING WELL COMPLETION LOG

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	**WS-14**	**1 of 11**

Project Name	**Siltronic Corporation**	TOC Elevation (feet)	
Project Location	**7200 NW Front Avenue Portland, Oregon**	Surface Elevation (feet)	**32.4**
Start/End Date	**6/22/2004 to 7/9/2004**	Northing	**705183.4**
Driller/Equipment	**Boart Longyear/Rotosonic**	Easting	**7624486.1**
Geologist/Engineer	**ABC/EB**	Hole Depth	**210.0-feet**
Sample Method	**4x6-inch core barrel.**	Outer Hole Diam	**10.0 to 6.0-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**100**	**CB**					0.0 to 1.3 feet: GRAVELLY SILT (ML); dark yellowish-brown; 70% fines, non plastic; 30% gravels, fine, subangular; trace organic debris; dry.
2									1.3 to 10.0 feet: SILTY SAND (SM); dark gray; 40-50% fines, low plasticity; 50-60% sand, fine; damp.
3						**PID = 0ppm.**			
4			**80%**	**CB**					
5						**PID = 0ppm.**			@ 5.0-feet: Increased fines to 50%.
6			**95%**	**CB**					
7									
8						**PID = 0ppm.**			
9									
10									@ 9.5-feet: slight odor.
11									10.0 to 11.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; no noticeable odor; damp.
12			**100**	**CB**					11.0 to 14.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace gravels, fine to coarse; trace organic debris; slight odor; tarr-like balls; damp.
13						**PID = 0ppm.**			
14									14.0 to 16.0 feet: SAND (SP); light grayish-brown; 100% sand, fine; trace fines; trace organic debris; no noticeable odor; damp.
15									
16			**100**	**CB**		**PID = 0ppm.**			16.0 to 18.5 feet: GRAVELLY SAND (SP); light grayish-brown; 70% sand, fine; 30% gravels, fine to medium, subangular; trace fines; damp.
17									
18									
19						**PID = 0ppm.**			18.5 to 22.0 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.
20									

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	**WS-14**	**2 of 11**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
21			**100**	**CB**					
22						**PID = 0ppm.**			*22.0 to 22.5 feet: SILT (ML); light brownish-gray; 85% fines, low plasticity; 15% sand, fine; trace gravels, fine to medium, subrounded; trace organic debris; trace woody debris; damp.*
23									*22.5 to 23.5 feet: SAND (SP); dark yellowish-brown; 100% sand, fine; trace fines, non plastic; damp.*
24			**100**	**CB**					*23.5 to 26.0 feet: GRAVELLY SILT (ML); light grayish-brown; 65% fines, medium plasticity; 35% gravels, fine to coarse, subangular; trace sand; moist.*
25						**PID = 0ppm.**			
26			**100**	**CB**					*26.0 to 29.0 feet: GRAVELLY SILT (ML); dark brownish-gray; 65% fines, medium plasticity; 35% gravels, fine to coarse, subangular; trace sand; strong sheen and odor; possible product; moist.*
27									
28						**PID = 29.7ppm.**			
29									*29.0 to 33.0 feet: SANDY SILT (ML); dark brownish gray; 65% fines, low plasticity; 35% sand, fine; heavy sheen and odor; tarry-like impacts, possible product; moist.*
30									
31			**100**	**CB**		**PID = 8.1ppm.**			
32									
33						**PID = 0ppm.**			*33.0 to 35.0 feet: SILTY SAND (SM); dark grayish-brown; 40% fines, low plasticity; 60% sand, fine; subrounded clast approximately 5-inches in diameter; heavy sheen and odor; moist.*
34									
35						**PID = 0ppm.**			*35.0 to 35.5 feet: SAND (SP); light yellowish-brown; 100% sand, fine; trace fines, non plastic; heavy sheen and odor; moist.*
36			**90**	**CB**					*35.5 to 38.5 feet: SAND (SP); dark brownish-gray; 100% sand, fine; trace fines, non plastic; heavy sheen and odor; globules; moist to wet.*
37									
38						**PID = 0ppm.**			
39									*38.5 to 52.5 feet: SILTY SAND (SM); dark brownish-gray; 25% fines, non to low plasticity; 75% sand, fine; trace gravels, subangular; strong odor; wet.*
40									
41			**100**	**CB**		**PID = 8ppm.**			
42									

NOTES: *1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.*

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	WS-14	3 of 11

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
43									
44						PID = 0ppm.			
45									
46									
47						PID = 0ppm.			
48									
49									
50						PID = 0ppm.			
51									
52									
53						PID = 0ppm.			52.5 to 53.0 feet: SILT (ML); dark brownish-gray; 90% fines, low plasticity; 10% sand, fine; strong odor; moist to wet.
54									53.0 to 55.5 feet: SILTY SAND (SM); dark brownish-gray; 25% fines, non to low plasticity; 75% sand, fine; trace gravels, subangular; strong odor; wet.
55									
56			100	CB		PID = 0ppm.			55.5 to 56.0 feet: SILT (ML); dark brownish-gray; 90% fines, low plasticity; 10% sand, fine; strong odor; moist to wet.
57									56.0 to 58.0 feet: SAND WITH SILT (SP-SM); dark brownish-gray; 15% fines, non plastic; 85% sand, fine; strong odor; wet.
58									58.0 to 66.0 feet: SILTY SAND (SM); dark brownish-gray; 15 to 20% fines, non to low plasticity; 75 to 80% sand, fine; trace cobbles, subrounded; strong odor; wet.
59						PID = 0ppm.			
60									@ 60.0 feet: 3-inch silt layer.
61			90	CB					
62						PID = 0ppm.			
63									
64									@ 63.5.0 feet: odor becoming slight.
65									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	WS-14	4 of 11

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
66						PID = 0ppm.			
			100	CB					66.0 to 67.0 feet: SANDY SILT (ML); dark grayish-brown; 80% fines, non to low plasticity; 20% sand, fine; micaceous; moderate odor; moist to wet.
67									67.0 to 69.5 feet: SAND (SP); dark grayish-brown; 5% fines, non plastic; 95% sand, fine; micaceous; no noticeable odor; moist to wet.
68						PID = 0ppm.			@ 68.0 feet: 2-inch silt layer.
69									
70									69.5 to 70.0 feet: SILT (ML); dark gray; 85% fines, low plasticity; 15% sand, fine; moist.
									70.0 to 71.0 feet: SAND (SP); dark grayish-brown; 5% fines, non plastic; 95% sand, fine; micaceous; moist to wet.
71			0	CB		PID = 0ppm. WS14-W-71			71.0 to 75.5 feet: NO RECOVERY.
72									
73									
74									
75									
76			100	CB		PID = 9.4ppm.			75.5 to 81.5 feet: SAND (SP); dark brownish-gray; trace to 5% fines, non plastic; 95 to 100% sand, fine; micaceous; slight odor; wet.
77									
78			100	CB		PID = 0ppm.			
79									@ 79.0 feet: trace silty balls.
80									
81						PID = 0ppm.			
82									81.5 to 82.5 feet: SILT (ML); dark gray; 90% fines, medium plasticity; 10% sand, fine; slight odor; wet.
83									82.5 to 83.5 feet: SAND (SP); dark gray; 100% sand, fine; trace fines; moderate odor; wet.
84						PID = 0ppm.			83.5 to 84.3 feet: SILT (ML); dark gray; 90% fines, medium plasticity; 10% sand, fine; slight odor; wet.
85									84.3 to 84.5 feet: SAND (SP); dark gray; 100% sand, fine; trace fines; moderate odor; wet.
									84.5 to 85.0 feet: SAND and SILT (SP-ML); dark gray; alternating 1/4-inch to 1/2-inch sand and silt layers; wet.
86						WS14-W-86			85.0 to 87.5 feet: SAND (SP); dark gray; 10% fines, non plastic; 90% sand, fine; micaceous; odor; wet.
87						PID = 0ppm.			

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	**WS-14**	**5 of 11**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
88			**100**	**CB**					*87.5 to 88.0 feet: SANDY SILT (ML); gray; 60% fines, low to medium plasticity; 40% sand, fine; micaceous; moderate odor; wet.*
89									*88.0 to 89.5 feet: SILTY SAND (SM); gray; 15% fines, non plastic; 85% sand, fine; micaceous; slight odor; wet.*
90						**PID = 13ppm.**			*89.5 to 90.5 feet: SILT (ML); dark gray; 100% fines, medium plasticity; trace sand, fine; micaceous; moist.*
91									*90.5 to 92.0 feet: SILTY SAND (SM); gray; 15% fines, non plastic; 85% sand, fine; micaceous; sheen and strong odor; wet.*
92									*92.0 to 96.0 feet: SILT (ML); gray; 100% fines, medium to high plasticity; trace sand, fine; micaceous; sheen and strong odor; moist. Several zones of 2-inch pockets with fine sand.*
93						**PID = 28.3ppm.**			
94									
95									
96			**100**	**CB**		**PID = 0ppm.**			*96.0 to 98.0 feet: SANDY SILT (ML); dark gray; 85% fines, medium plasticity; 15% sand, fine; micaceous; strong odor; moist.*
97									
98									*98.0 to 102.0 feet: SAND (SP); dark gray; 5% fines, non plastic; 95% sand, fine; micaceous; strong odor; wet. Between 99.0 and 99.5 feet several 1/2-inch silt bands intermixed with sand.*
99						**PID = 0ppm.**			
100									
101						**WS14-W-101**			*@ 100.5 feet: 1-inch silt layer.*
102			**100**	**CB**		**PID = 0ppm.**			*102.0 to 105.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; sheen and strong odor; wet.*
103									
104									
105						**PID = 84ppm.**			*105.0 to 105.5 feet: SILT (ML); gray; 90% fines, low plasticity; 10% sand, fine; strong odor; moist.*
106									*105.5 to 106.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; sheen and strong odor; wet.*
107									*106.0 to 108.0 feet: SILT (ML); gray; 100% fines; low plasticity; trace sand, fine; trace rootlets; moderate odor; moist.* *@ 107.0 feet: 2-inch gray sand layer with stong odor.*
108						**PID = 9.5ppm.**			*108.0 to 108.5 feet: SILTY SAND (SM); gray; 30% fines, low plasticity; 70% sand, fine; sheen and strong odor; wet.*
109									*108.5 to 110.5 feet: SILT (ML); gray; 100% fines; low plasticity; trace sand, fine; sheen and strong odor; moist.* *@ 109.0 feet: 4-inch silty sand layer with sheen and strong odor.*
110									

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	WS-14	6 of 11

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
111			100	CB		PID = 0ppm.			110.5 to 111.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; slight odor; wet. 111.0 to 113.0 feet: NO RECOVERY; sluff.
112									
113						PID = 0ppm.			113.0 to 114.0 feet: SANDY SILT (ML); dark brownish-gray; 60% fines, non to low plasticity; 40% sand, fine; micaceous; faint odor; moist to wet.
114									114.0 to 120.5 feet: SAND (SP); dark brownish-gray; 5% fines, non plastic; 95% sand, fine; micaceous; no noticeable odor; wet.
115									
116						PID = 0ppm.			@ 116.0 feet: 3-inch silt layer.
117									
118									
119						PID = 0ppm.			
120						WS14-W-120			
121			100	CB					120.5 to 121.0 feet: SILT (ML); dark brownish-gray; 85% fines, low plasticity; 15% sand, fine; micaceous; moist. 121.0 to 132.5 feet: SAND (SP); dark gray; 100% sand, fine; trace fines; micaceous; wet.
122									
123									
124						PID = 0ppm.			@ 124 feet: sheen and strong odor present.
125									
126									
127						PID = 0ppm.			
128									
129									
130						PID = 0ppm.			@ 130 feet: sheen and strong odor fading.
131									
132									

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	WS-14	7 of 11

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
133						PID = 0ppm.			132.5 to 133.5 feet: SILT (ML); dark grayish-brown; 90% fines, low plasticity; 10% sand, fine; micaceous; moist.
134									133.5 to 134.0 feet: SAND (SP); dark gray; 100% sand, fine; trace fines; micaceous; wet.
									134.0 to 134.5 feet: SILT (ML); dark grayish-brown; 90% fines, low plasticity; 10% sand, fine; micaceous; moist.
135									134.5 to 136.0 feet: SAND (SP); dark gray; 100% sand, fine; trace fines; micaceous; wet.
136			0	CB					@ 135.5 feet: 3-inch silt layer.
									136.0 to 138.5 feet: NO RECOVERY.
137									
138									
139			100	CB		PID = 0ppm.			138.5 to 141.5 feet: SAND (SP); dark gray; 5% fines, non plastic; 95% sand, fine; micaceous; slight odor; wet.
140									
141									
142			100	CB		PID = 0ppm. WS14-W-142			141.5 to 142.0 feet: SILT (ML); dark brownish-gray; 85% fines, low plasticity; 15% sand, fine; micaceous; moist.
									@ 141.7 feet: 1-inch sand layer.
143									142.0 to 143.0 feet: SAND (SP); gray; 100% sand, fine; trace fines; wet.
									143.0 to 145.0 feet: SILT (ML); gray; 100% fines, medium to high plasticity; trace sand; moist.
144									@ 143.5 feet: 3-inch sand layer.
145						PID = 0ppm.			145.0 to 148.5 feet: SILT (ML); gray; 100% fines, medium to high plasticity; intermixed with 1-inch to 2-inch sand layers; moist.
146									
147									
148									
149						PID = 0ppm.			148.5 to 149.0 feet: SAND (SP); gray; 100% sand, fine; trace fines; wet.
									149.0 to 149.5 feet: SILT (ML); gray; 100% fines, medium to high plasticity; trace sand; moist.
150			100	CB		WS14-W-150			149.5 to 150.0 feet: SAND (SP); gray; 100% sand, fine; trace fines; wet.
									150.0 to 167.0 feet: SAND (SP); gray; 5% fines, non plastic; 95% sand, fine to medium; trace wood debris; wet.
151									
152						PID = 0ppm.			@ 152.0 feet: 2-inch silt layer.
153									
154									
155									

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	**WS-14**	**8 of 11**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
156						**PID = 0ppm.**			*@ 155.0 feet: Wood fragments.*
157									*@ 157.0 feet: 3-inch silt layer.*
158						**PID = 0ppm.**			
159									
160									
161						**PID = 0ppm.**			
162									
163									
164						**PID = 0ppm.**			
165									
166									
167			**100**	**CB**		**PID = 0ppm.**			*167.0 to 167.5 feet: NO RECOVERY; sluff.*
168						**WS14-W-167**			*167.5 to 169.5 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; wet.*
169									
170						**PID = 0ppm.**			*169.5 to 172.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; increasing fines to 15%; wet.*
171									
172									*172.0 to 173.0 feet: SILTY SAND (SM); gray; 35% fines, non plastic; 65% sand, fine; wet.*
173						**PID = 0ppm.**			*173.0 to 182.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; wet.*
174									
175									
176						**PID = 0ppm.**			
177			**100**	**CB**					

NOTES: *1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.*

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	WS-14	9 of 11

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
178									
179						PID = 0ppm.			
180									
181									
182			80	CB		PID = 0ppm. WS14-W-182			182.0 to 185.5 feet: NO RECOVERY; sluff.
183									
184									
185									
186						PID = 0ppm.			185.5 to 186.5 feet: Sand (SP); gray; 100 % sand, fine; micaceous; trace fines; wet.
187									186.5 to 188.0 feet: SILTY SAND (SM); gray; 35% fines, low plasticity; 65% sand, fine; wet.
188									188.0 to 190.0 feet: SILT (ML); gray; 100% fines, low to medium plasticity; damp.
189						PID = 0ppm.			@ 189.0 feet: 2-inch fine, sand layer.
190									190.0 to 195.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; wet.
191									
192			100	CB		PID = 0ppm.			
193									
194									
195						PID = 0ppm.			195.0 to 196.0 feet: SILTY SAND (SM); gray; 50% fines, low plasticity; 50% sand, fine; wet.
196									196.0 to 197.0 feet: SAND (SP); gray; 100% sand, fine; micaceous; trace fines; wet.
197			90	CB		WS14-W-197			197.0 to 198.0 feet: SILT (ML); gray; 100% fines, medium to high plasticity; damp.
198						PID = 0ppm.			198.0 to 204.0 feet: SAND (SP); gray; 100% sand, fine to medium; micaceous; trace fines; wet.
199									
200									

NOTES: 1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
8128.01.08	**WS-14**	**10 of 11**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
201						**PID = 0ppm.**			
202									
203									
204						**PID = 0ppm.**			*204.0 to 208.0 feet: GRAVEL with SILT (GW-GM); gray; 15% fines, non plastic; 85% gravels, fine to coarse, subangular to subrounded; wet.*
205									
206									
207									
208						**WS14-W-208**			*208.0 to 210.0 feet: BASALT; light gray to dark gray; moist to wet; bedrock. (Columbia River Basalt Group) Significant increase in resistance, drilling hardness.*
209									
210									*Total Depth = 210.0 feet.*

WS14 Completion Details

Oregon Water Resources Department Well Start Card Number: 164731
Oregon Water Resources Department Well Identification Number: L67967

Boring:
0.0 to 69.0 feet bgs: 10-inch temporary, threaded steel, isolation casing.
0.0 to 110.0 feet bgs: 9-inch temporary, threaded steel, isolation casing.
0.0 to 135.0 feet bgs: 8-inch temporary, threaded steel, isolation casing.
0.0 to 210.0 feet bgs: 6-inch temporary, threaded steel, isolation casing.
0.0 to 210.0 feet bgs: 4x6-inch core barrel sampler.

0.0 to 1.5 feet bgs: flush mount vault and cement seal.
1.5 to 7.0 feet bgs: 1/4-inch Baroid bentonite chips hydrated with potable water.
7.0 to 104.0 feet bgs: bentonite grout slurry, 10.0 pounds per gallon.
104.0 to 106.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter pack.
106.0 to 125.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.
125.0 to 140.0 feet bgs: non-IPA coated, 1/4-inch bentonite pellets hydrated with potable water.
140.0 to 142.0 feet bgs: 20x40 washed Colorado silica sand, secondary filter pack.
142.0 to 161.0 feet bgs: 10x20 washed Colorado silica sand, primary filter pack.
161.0 to 210.0 feet bgs: non-IPA coated, 1/4-inch bentonite pellets hydrated with potable water.

NOTES: *1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.*

Maul Foster & Alongi, Inc.	Geologic Borehole Log/Well Construction		
	Project Number **8128.01.08**	Well Number **WS-14**	Sheet **11 of 11**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Sample Data: Percent Recovery	Sample Data: Collection Method	Sample Data: Number	Sample Data: Name (Type)	Sample Data: Blows/6"	Lithologic Column	Soil Description

Well WS14-125:
0.0 to 109.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe.
109.0 to 124.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.
124.0 to 125.0 feet bgs: 2-inch diameter, stainless steel sump.

Well WS14-161:
0.0 to 145.0 feet bgs: 2-inch diameter, schedule 40 PVC blank riser pipe.
145.0 to 160.0 feet bgs: 2-inch diameter, stainless steel wire wrapped screen, 0.010-slot.
160.0 to 161.0 feet bgs: 2-inch diameter, stainless steel sump.

NOTES: *1. CB = 4x6-inch core barrel soil sampler. 2. PID = Photo ionization detector, soil head space reading in parts per million. 3. GW = groundwater sample, dashed graphic indicates approximate screened interval. 4. bgs = below ground surface. 5. PVC = poly vinyl chloride. 6. Odor characteristic of manufactured gas plant waste.*

ATTACHMENT B

OWRD WELL LOG

MULT 73686

STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

L 69467 73526

Start Card # 164731

(1) OWNER/PROJECT: WELL NO. WS-13

Name Siltronic Corporation

Address 7200 NW Front Ave

City Portland State OR Zip 97210

(2) TYPE OF WORK:

☒ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☐ Abandonment

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☒ Other Sonic

(4) BORE HOLE CONSTRUCTION

Special Standards ☒ Yes ☐ No Depth of completed well 161 ft.

Land surface

Vault 0 ft. TO 1 ft.

Seal 1 Seal 2 126 ft.

110 145 TO ft.

Filter pack 110 145 ft.

126 161 TO ft.

- Water-tight cover
- Surface flush vault
- Locking cap
- Casing diameter 2, 2 in. material Ak Ak
  Welded ☐ Threaded ☒ Glued ☐
- Liner diameter ____ in. material ____
  Welded ☐ Threaded ☐ Glued ☐
- Well seal: Material Bentonite Amount 200cal, 400cal Grout weight 9.7
- Borehole diameter 9 in.
- ☐ Bentonite plug at least 3 ft. thick
- Screen material PVC
  intervals): From 111 To 126 From 146 To 161
  Slot size .010 in.
- Filter pack: Material Sand Size 10x20 in.

(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability ____ Yield ____ GPM

Conductivity ____ PH ____

Temperature of water NOT OBSERVED Depth artesian flow found ____ ft.

Was water analysis done? ☐ Yes ☐ No

By whom? ____

Depth of strata to be analyzed NOT OBSERVED ft.

Remarks: ____

Name of supervising Geologist/Engineer ____

(6) LOCATION OF WELL By legal description

Well Location: County Multnomah

Township 1 (N) or S) Range 1 (E) or W) Section 13

1. NW 1/4 of NW 1/4 of above section.

2. Either Street address of well location 7200 NW Front Ave

or Tax lot number of well location 1200

3. ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

NOT OBSERVED ft. below land surface Flow

Artesian Pressure ____ lb/sq. in. Date ____

(8) WATER BEARING ZONES:

Depth at which water was first found ____

From	To	Est. Flow Rate	SWL
NOT OBSERVED			

(9) WELL LOG: Ground elevation ____

Material	From	To	SWL
Sand & Gravels	0	40	
Sand	40	204	
Basalt	204		
Naked well Special Standard Request on file.			
Drilled well To 204' back-filled with bentonite from 204' To 161			
Bentonite	161	204	
4-200cal			

RECEIVED

AUG 09 2004

WATER RESOURCES DEPT
SALEM, OREGON

Date started 6/27/04 Completed 7/8/04

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number 10570

Signed [signature] Date 7/21/04

(bonded) Monitor Well Constructor Certification:

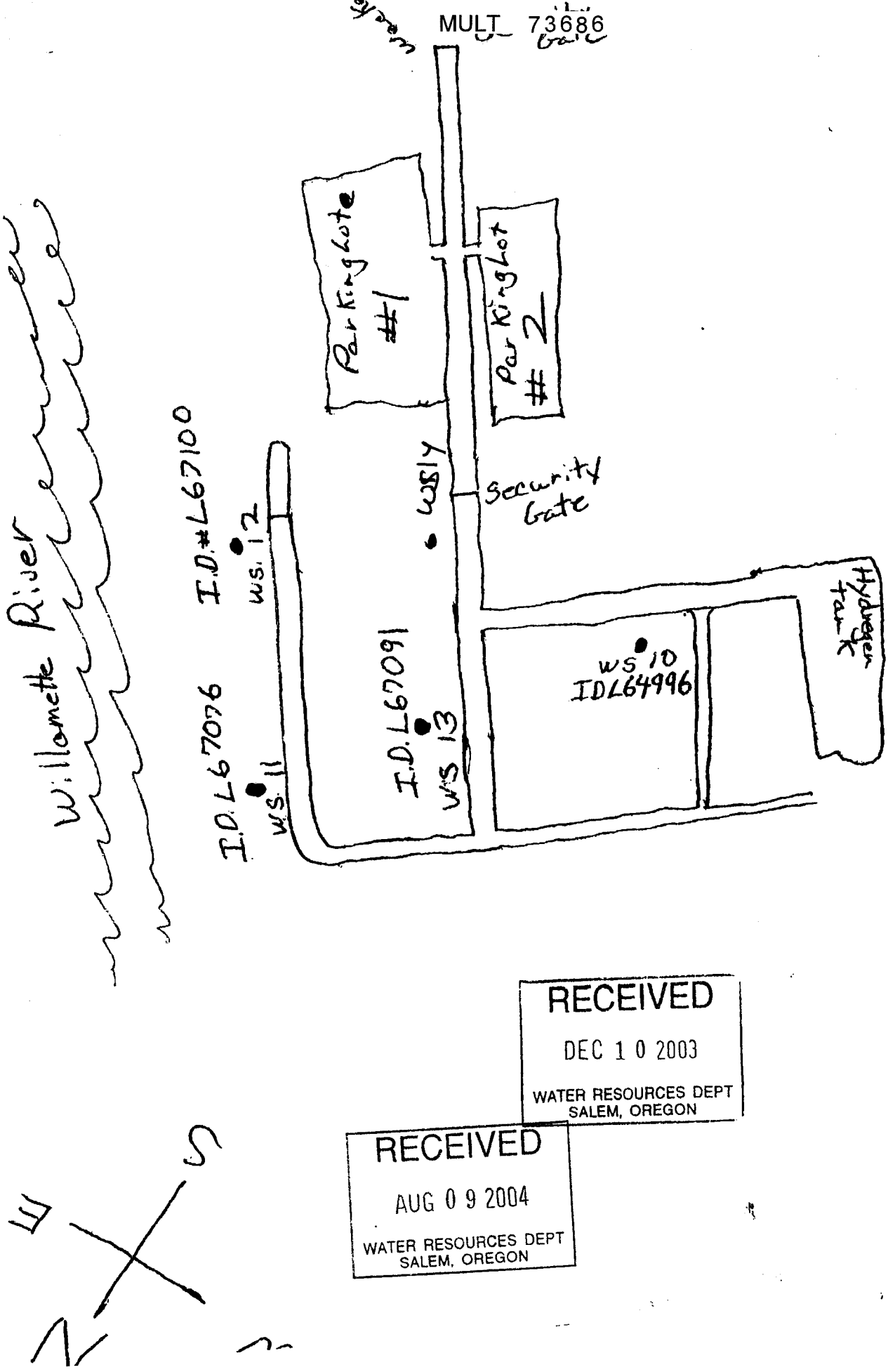
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 1224

Signed [signature] Date 7/21/04

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

MULT 73686



W S

N

INSTRUCTOR THIRD COPY-CUSTOMER Date